# Numerical modeling of tsunami generation by submarine landslide

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**Abstract.** A new mathematical model is derived to describe the generation and propagation of water waves by a submarine landslide. The general model consists of a depth-integrated continuity equation and momentum equation, in which the ground movement is a forcing function. These equations include full nonlinear, but weakly dispersive effects. A set of governing equations for debris flows are presented, following Savage and Hunter (1989), and are used to model the landslide evolution in time. A finite difference algorithm is developed for the two systems of equations, incorporating a moving boundary scheme. Laboratory data (Hammack 1973, Watts 1997) are used to validate the numerical model. As a case study, tsunamis generated by a prehistoric massive submarine slide off Northern Puerto Rico are modeled. Run-up predictions along the coastline are given.

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